



## Conceptualizing climate vulnerability: Understanding the negotiating strategies of Small Island Developing States



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### ARTICLE INFO

**Keywords:**  
 Vulnerability  
 Small Island Developing States (SIDS)  
 Alliance of Small Island States (AOSIS)  
 Climate change  
 United Nations Framework Convention on Climate Change (UNFCCC)  
 Adaptation  
 Mitigation  
 Climate change negotiations

### ABSTRACT

The discourse on vulnerability to climate change presents many complexities. Among these are the constant tension between policy makers and academics. This paper unpacks these complexities in order to analyze how Small Island Developing States (SIDS) deal with the notion of vulnerability at the United Nations Framework Convention on Climate Change (UNFCCC). The lack of a clear definition of vulnerability at the UNFCCC has created many tensions among developing countries because the notion of vulnerability is associated with financial and technical resource distribution. However, on a strategic level SIDS have had to demonstrate their vulnerabilities within the UNFCCC in order to remain relevant and compete with other groups for these resources. This paper highlights some of these tensions, especially among developing countries, through an in-depth analysis of vulnerability within academia and foreign policy through the UNFCCC. We argue that competing definitions of vulnerability by academics and policymakers evoke different methodologies for understanding and measuring vulnerability. Further, we find that within the UNFCCC, prioritizing mitigation policies over adaptation has increased SIDS' vulnerability.

### 1. Introduction

Global climate change is one of the most important issues facing mankind. While there is a widespread consensus on the realities of climate change, the difficulties in tackling it are very prevalent. One of the reasons is because there is no clear conceptualization of climate vulnerability within climate change discourse both at the policy front and within the academy. Adger (2006) describes vulnerability as “the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt.” For example, during a coordination session among the members of the G77 and China (G77) on adaptation at the 2013 Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) and Meeting of the Parties to the Kyoto Protocol (MOP) in Warsaw, many delegates acknowledged that the lack of a clear mechanism to measure vulnerability makes adaptation policy and measurement very complex.<sup>1</sup> On a political level it appears that the debate around vulnerability creates so much tension that parties are unable to move beyond the preamble of the convention that identifies specific vulnerabilities such as “low-lying and other small island countries, countries with low-lying coastal, arid and semi-arid areas or areas liable to floods, drought and desertification, and developing

countries with fragile mountainous ecosystems” (UNFCCC, 1992). These complexities extend to academia as well, as scholars from various fields and traditions use different criteria to measure and define vulnerability (McLaughlin and Dietz, 2008).

This paper seeks to depict the assessment of the terms vulnerability within academic literature and foreign policy practices, using the UNFCCC as a case study to evaluate the various negotiating strategies that the Alliance of Small Island States (AOSIS) has taken at the UNFCCC, post-Kyoto. Specifically, we seek to answer the following questions: how do academics and policy-makers conceptualize vulnerability differently, and how do the UNFCCC negotiations, specifically with respect to AOSIS, exemplify these differences? We first examine the major academic discourses that unpack the complexities of defining and measuring vulnerability. Next, drawing on insights obtained from interviews with AOSIS policymakers, we investigate the policy implications of the varying interpretations of these terms for small island states (SIDS) within the UNFCCC process, operationalized through AOSIS' negotiating strategies. By analyzing AOSIS' role in the UNFCCC, we aim to reveal how the vulnerability discourse and its theoretical underpinnings in the academic literature have been instrumental in shaping proceedings at the highest level of climate negotiations.

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<sup>1</sup> Personal observation by Neil Oculi in Warsaw, when many delegates made such comments.

## 2. Vulnerability discourse in academia and the UNFCCC

The academic literature demonstrates a lack of a clear conceptualization of vulnerability, leading to failures in dealing with vulnerability in the policy realm. We present two major issues that complicate debates on vulnerability. First, academics and policymakers commonly invoke competing definitions and interpretations of the term. Second, methodologies for understanding and measuring vulnerability are highly varied, complicating usage of the term in academia and policy. While these two issues are related, addressing each issue in turn facilitates a more coherent analysis.

### 2.1. Conceptualizations of vulnerability

While many geographers have written about vulnerability, Timmerman (1981) was one of the first to conceptualize the term (Cutter, 1996). Timmerman's work was motivated by an effort to develop a social component within the World Climate Program carried out by the World Meteorological Organization (WMO). Timmerman's description of vulnerability is reflective of one of the main objectives of the WMO in 1980:

"Determining the characteristics of human societies at different levels of development and in different natural environments which make them either specially vulnerable or specially resilient to climate variability and change which also permit them to take advantage of the opportunities by such changes..." (Timmerman, 1981)

Timmerman (1981) notes that "vulnerability is a term of broad use as to be almost useless for careful description at the present, except as a rhetorical indicator of areas of greatest concern". What Timmerman was explaining was the fact that although vulnerability and resilience have been widely used in the past in many different fields such as energy, risk management, and climate impact assessment, there is no clear conceptual framework of the term. In this regard, he does provide a definition of vulnerability, "the degree to which a system may react adversely to the occurrence of a hazardous event," and also resilience, "the measure of a system's, or part of a system's capacity to absorb and recover from the occurrence of a hazardous event". Nevertheless, Timmerman definition did not resolve the issues or inconsistencies in the meanings of vulnerability. As indicated by Cutter (1996) a major part of "the discrepancies is the fact that the meanings of vulnerability arise from different epistemological orientations (political ecology, human ecology, physical science, spatial analysis) and subsequent methodological practices."

Vulnerability assessments have played an integral part in our understanding of the impact of climate change and aim to inform the development of policies that reduce the risks associated with climate change (Füssel and Klein et al., 2006). The literature on vulnerability to climate change is extensive resulting both in opportunities as well as challenges. In evaluating divergent methods and epistemologies in vulnerability scholarship, Adger (2006) argues that such diversity is a strength and a sign of vitality, not a weakness. He notes that the strength of vulnerability research is reflective on the various research and phenomena it explains. Vulnerability research covers many fields, making its interpretation and mode of inquiry vastly different. However, citing Kasperton and Kasperton (2001), he asserts that "a comprehensive theory of vulnerability to global change therefore needs to account for a range of risks, thresholds and institutional responses and resources, given that vulnerability will manifest itself differently at different scales." McLaughlin and Dietz (2008) assess the strength and weaknesses of human vulnerability to climate change from different perspectives: biophysical, human ecological, political economy, constructivist and political ecology. They explain that "while each of these perspectives offers important insights, and some theoretical convergence is evident, the field remains divided along a number

theoretical fracture lines." In reviewing the literature on these five perspectives of vulnerability to climate change, McLaughlin and Dietz (2008) argue that there is a need for more research on addressing the interrelated dynamics of social structure, human agency and the environment(s)."

Early research on vulnerability approached the concept through a focus on risk, hazard, and disaster mitigation (Cutter, 2012). This research was based on three questions: 1) what is the human occupancy of hazard zones? 2) How do people and societies respond to environmental hazards and what factors influence their choice of adjustments? 3) How do you mitigate the risk and impact of environmental hazards (Cutter, 1996)? Citing Coburn and Spence (1992) and Clayton (1994), Cutter notes that these research questions mainly examine hazard reduction through a structural (engineered) approach. For example, Smit et al. (2000) describe mitigation as the means to "abate, moderate or alleviate, could be (and sometimes is especially in the environmental hazards, engineering and insurance fields) applied to impacts, as in mitigate vulnerabilities and effects by adjusting practices or structures." In the 1990s, vulnerability assessment formed an integral part of international efforts to reverse poverty, population, development, and environmental degradation, such as the UN's International Decade of Disaster Reduction (IDNDR). This so-called risk-hazard approach focuses on the magnitude of exposure to physical systems, and is associated with the technical literature on risk and disaster management (Dilley and Boudreau, 2001; Turner et al., 2003; Willows et al., 2003; Thomalla et al., 2006). Risk assessment establishes information concerning exposure to hazards which inform the level of exposed vulnerability. Risk assessment in climate change identifies hazards that may be caused or exacerbated by climate change, and evaluates the likelihood and relative magnitude of these hazards in order to prioritize responses and alleviate risks (Wratt et al., 2004). However, little attention was given to the role of social factors in risk-hazard approaches to vulnerability.

Adger (2006) points out that later insights into the social resilience of ecological systems complement the analytical tool kit of risk-hazard vulnerability assessment. However, citing Berkes and Folke (1998), he notes "there is no single universally accepted way of formulating the linkages between human and natural environment." For example, human interactions through property resources scholarship as noted by (Dolšak and Ostrom, 2003; Adger, 2006) places institutions as the key agent to deal with political, social, and economic organization within a social-ecological system. According to Füssel (2007), vulnerability must be treated differently within the three climate change policy prescriptions: mitigation, which focuses on emissions reduction; adaptation, which moderates the adverse effects of climate change; and compensation for climate change impacts through monetary and non-monetary assistance. Füssel (2007) notes that the risk-hazard approach is most appropriate for mitigation and compensation, while adaptation policies require a political economy approach to vulnerability, focused on individual and community well-being and capacity to cope with various external stresses. This political economy approach has also been described as the social constructivist framework (Füssel and Klein et al., 2006) and frames vulnerability through class phenomena, through the work of philosophers such as Marx, Weber, and Durkheim (Foster and Bellamy, 1999 and Pelling, 2003). Füssel and Klein et al., 2006 observe that a social constructivist framework "regards (social) vulnerability as an a priori condition of a household or a community that is determined by socio-economic and political factors" (see also Dow, 1992; Adger and Kelly et al., 1999; Blaikie et al., 2014). In examining the political economy of Nicaragua, Gerulitis-Darcy (2008) reflects on the structural origin of disasters to argue that vulnerability and disasters are socially produced. Gerulitis-Darcy (2008) presents a macro-analysis of the political and economic forces that create conditions for increased vulnerability to natural disasters such as hurricanes and argues that "the state of the contemporary international political economy is a stimulus for the study of disaster[s] that requires a multi-dimensional analysis of the

social causes of disaster[s]". [Gerulis-Darcy \(2008\)](#) continues by investigating aspects of the globalized neoliberal political economy such as structural adjustment policies (SAPS), claiming that they magnify social, political, economic, and ecological crises. He argues that pre-existing social constraints must be included, to properly analyze natural disasters and extreme weather events. As indicated by [Füssel, \(2007\)](#), "the political economy approach [indicates] that structure not nature, technology, or agency creates vulnerability."

Conceptualizations of climate vulnerability are further split between contextual vulnerability and outcome vulnerability. [O'Brien et al. \(2004\)](#) argue that "extensive use of vulnerability in the climate change literature hides two very different interpretations of the word, and two very different purposes for using it." These interpretations are based on different analytical frameworks, which warrant different strategies for reducing vulnerability. Contextual vulnerability (also referred to as starting-point interpretation) is rooted in political economy and mainly highlights internal social vulnerability. In this approach to vulnerability, the main focus is on sustainable development to increase the response capacity of human populations to hazards. It views vulnerability as a starting point for illustrating multiple environmental and social processes in order to comprehend how the effects of climate change will be distributed ([O'Brien et al., 2004](#)). According to [O'Brien et al. \(2004\)](#), this contextual approach to vulnerability is favored within the entitlement literature, "regarding access to resources, on political economy in explaining the factors that lead to vulnerability, and on social capital as a means of claiming entitlements and pursuing coping mechanisms" see also ([Sen, 1981](#); [Downing et al., 1996](#); [Kelly and Adger et al., 2000](#); [Adger, 2003](#)).

In contrast, outcome vulnerability (also referred to as end-point interpretation or integrated cross-scale vulnerability) focuses on potential climate impacts and on socio-economic capacity to cope and adapt. The strategies that the outcome vulnerability framework employs mainly focus on technological adaptation to minimize particular impacts of climate change. This interpretation places vulnerability at the end point of analysis by focusing on the residual impact of climate change minus adaptation ([O'Brien et al., 2004](#)). It defines the extent of climate problems and provides input to policy-makers on the cost of climate change versus costs related to greenhouse gas mitigation efforts ([O'Brien et al., 2004](#)). End point analysis employs future projections of emission trends and climate scenarios, and is often used within technical literature on disasters by economist, engineers, and epidemiologists. ([O'Brien et al., 2004](#)). These differentiated conceptualizations result in different means of vulnerability measurement as well. For example, the UNDP's Disaster Risk Index (DRI) is primarily a quantitative tool for measuring and comparing exposure to hazards between countries, while its Hotspots project puts greater emphasis on social indicators such as mortality, income, and GDP ([UNDP, 2004](#)). Further models of differentiated vulnerability measurement are presented by [Turner et al. \(2003\)](#). The reduced-formed (RH) model analyzes vulnerability through a chain sequence beginning with hazard event, followed by exposure, sensitivity, and impact. This model seeks to explain the impact of a hazard as a function of exposure to the hazard. However, [Turner et al. \(2003\)](#) point out several inadequacies of the RH model, including (i) how the model amplifies the impacts of a hazard; (ii) how the model leads to significant variations in the consequences of a hazard; and (iii) how social structures and institutions mediate hazard exposure and consequences. In contrast, the pressure-and-release (PAR) model (common to risk research) places emphasis on social conditions of exposure, where vulnerability is a function of either the perturbation, stressor, or stress on the exposure of vulnerable units. The limitation of this model is that it does not address sufficiently broad concerns of sustainability science, including human-environment systems, vulnerability of biophysical systems, and structure of the hazard's causal sequences (e.g. nested scales of interaction).

Because climate change research is characterized by "intense collaboration between scholars from many different research traditions,

including climate science, risk assessment, development, economics, and policy analysis" ([Füssel, 2007](#)), competing conceptualizations and methods of measuring vulnerability can complicate efforts by researchers to find common ground. Collaborating from different traditions creates a "conceptual cluster" within which researchers define a common terminology in order to develop shared conceptual framework ([Newell et al., 2005](#); [Füssel, 2007](#)). [Füssel \(2007\)](#) illustrates the divisions within the vulnerability discourse among conceptual clusters by asking a hypothetical question: "which of two regions is more vulnerable to climate change and variability: Florida or Tibet?" While some scholars would answer Tibet due to resource limitations, political instability, and its less diverse economy, others would say Florida due to its low elevation and exposure to hurricanes and sea level rise. Moreover, others may have difficulty answering the question or may choose not to answer the question unless provided with sufficient information, "preferably probabilistic, scenarios of regional climate change and sea-level rise" ([Füssel, 2007](#)). These divergent responses are underpinned by fundamentally different understandings of who "counts" as vulnerable, complicating efforts to devise interdisciplinary solutions to problems associated with climate change. In sum, there has been much debate and scholarship on vulnerability, resulting in the proliferation of contrasting and often competing interpretations of the term by scholars across the physical and social sciences. This has led to inconsistencies in the meaning of vulnerability within the academic community in both epistemological orientation and methodologies of assessment.

## 2.2. Vulnerability discourse at the UNFCCC

The UNFCCC also faces many challenges in defining and evaluating vulnerability. Multiple, differentiated explanations of vulnerability by the scientific community through the Intergovernmental Panel on Climate Change (IPCC) have serious policy ramifications because the IPCC is the main scientific body that provides technical and socio-economic information on climate change to policymakers within the UNFCCC. The UNFCCC clearly articulates responsibilities and obligations of all parties to deal with issues of adaptation (see Article 4(1)). However, within the UNFCCC, the design and implementation of adaptation measures to address the needs of vulnerable countries have become increasingly pressing and challenging. A key challenge is the fact that much of the ambiguous and imprecise language used within the UNFCCC does not provide clear operational guidelines concerning key aspects of vulnerability, such as the identification of particularly vulnerable countries. In defining vulnerability as it relates to climate change, the IPCC's account of vulnerability is underpinned by an outcome or end-point vulnerability framework, by which vulnerability is characterized as a function of a system's exposure and sensitivity to climatic stimuli and their adverse effects ([McCarty et al., 2001](#) and [IPCC, 2007](#)). However, other discussions of vulnerability in the IPCC offer contradictory definitions of the term ([Brooks et al., 2005](#)). The IPCC Third Assessment Report ([IPCC, 2001](#)) also describes vulnerability as: "The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity." As [Brooks \(2003\)](#) explains, these two IPCC definitions are inconsistent. In the first definition, vulnerability of a system is viewed as a function of its sensitivity, while the second views vulnerability as a subset of sensitivity. Further, "vulnerability in IPCC Def. 2 is therefore a subset of one of the determinants of vulnerability as defined in IPCC Def. 1, making the two definitions contradictory, provided they are assumed to be describing the same type of vulnerability" ([Brooks, 2003](#)) These contradictions highlight one of the major debates and principal disagreements on the definition of vulnerability within climate change research, which is whether or not vulnerability is the result of internal characteristics of a system (social or contextual vulnerability), or whether it depends primarily on

whether the system is exposed to a particular hazard (biophysical or outcome vulnerability). These disagreements in vulnerability scholarship trickled down to the IPCC report, and thus to the UNFCCC. The IPCC 5th Assessment Report (AR5) included an assessment of adaptation vulnerability that “moved further from a focus on biophysical vulnerability to the wider social and economic drivers of vulnerability and people’s ability to respond” (Noble et al., 2014). However, the majority of these vulnerability assessments are focused on impact vulnerability and adaptation planning (Noble et al., 2014), as opposed to social implications of vulnerability. Such an approach is underlined by the fact that engineering and technological options are still the most common approaches to adaptation (Noble et al., 2014). Greater emphasis on impact vulnerability and adaptation has directed National Adaptation Programs of Action (NAPAs) both in urban and regional programs within both developed and developing countries. Such a focus on impact vulnerability is insufficient because it does not provide a holistic understanding of vulnerability that incorporates the role of human agency.

To further explore this definitional ambiguity, the author (Oculi) conducted semi-structured interviews with AOSIS policymakers during climate negotiations at COP 15 (Copenhagen, Denmark), COP 16 (Cancun, Mexico), and, COP 19 (Warsaw, Poland). Initial interviews were conducted in person, and follow-up interviews were conducted via Skype and email. By combining these methodologies, this paper captures the complex issues that SIDS face both within and outside the UNFCCC processes. Semi-structured interviews were used to explore assumptions and experiences of how vulnerability was perceived and interpreted by policymakers, and to give policymakers opportunities to discuss issues they believe are important to their constituencies in an informal, conversational setting (Clifford et al., 2016). Interviews began with the following question(s):

- 1 Is there a formal definition of vulnerability that parties follow at the negotiations?
- 2 Are there any conflicts by state parties regarding definitions or concepts of vulnerability?
- 3 How has AOSIS addressed issues of vulnerability at the negotiations?
- 4 Where have debates on vulnerability primarily taken place?

Interviews revealed that the UNFCCC negotiating process does not provide sufficient guidelines for determining which countries are most vulnerable. As explained by M.J. Mace, negotiator for Saint Lucia at COP 19 (2013): “The tricky thing about vulnerability is that we haven’t defined it in the negotiating process, though it’s certainly discussed in National Communications or Nat Comms [impacts, vulnerability assessments] and probably in some guidance documents.” Nat Comms are reports that detail steps that countries have taken to implement the outcomes of UNFCCC proceedings, and are periodically updated and made available to the COP. According to Mace:

“From a political point of view, there is certainly a debate around who is vulnerable, so it is difficult to move beyond the preamble of the convention that lists out specific vulnerabilities. Within the process Parties also haven’t been able to agree on any sort of vulnerability index, so that never comes up anymore. Any time anyone ever tried it, it died. I guess one issue that has come up implicitly is economic vulnerability - or perhaps better expressed as an absence of economic resilience, in the recognition of LDCs among those particularly vulnerable.”

The lack of clarity as to who is vulnerable parallels the conflicting modes of inquiry and measurement of vulnerability presented in the academic literature. As a result of this ambiguity, policy makers are less able to achieve consensus on issues related to vulnerability within the UNFCCC. For example, as Noble et al. (2014) point out, the IPCC AR5 offers “conflicting views concerning the choice of metrics [to measure

adaptation needs], as governments, institutions, communities, and individuals value needs and outcomes differently and many of those values cannot be captured in a comparable way by metrics.” For example, the Common Wealth Vulnerability Index indicates that SIDS are more vulnerable to extreme economic forces than larger developing countries (Secretariat Commonwealth, 2000). It focuses on a country’s ability to bounce back or resist economic, environmental, political, and social shocks (Easter, 1999) and emphasizes three critical factors that determine a country’s vulnerability: lack of diversification, trade dependence and the impact of natural disasters. As indicated by Crispin Dauvergne (lead negotiator for Saint Lucia), the Common Wealth Index, a widely accepted index for measuring vulnerability at the UNFCCC. Nine of the ten countries listed as the most vulnerable according to the Common Wealth Index are members of SIDS. However, the Vulnerability Index to Latin America and the Caribbean Region by the CAF Development Bank shows that most Latin American countries are more vulnerable than SIDS (CAF, 2014). The CAF index aggregates three different indices; exposure index (50%), sensitivity (25%), and adaptive capacity (25%). In the CAF index seven of the ten most vulnerable countries are Latin American countries, four of which are members of SIDS. For example, Guatemala is the second most vulnerable country in the CAF index but it ranks 24 among countries in Latin America and Caribbean in the Common Wealth Index.

Ian Fry, negotiator for Tuvalu, noted that while there is no formal definition of vulnerability, the Bali Action refers to particularly vulnerable countries being Small Island Developing States, Least Developed Countries and countries in Africa that suffer from droughts and floods. In AOSIS’s negotiating strategies on vulnerability, the language of the Bali Action Plan (1.Ci) was used successfully until Cancun. The Bali Action plan was an ambitious set of decisions taken by COP 13 in 2007, which provided a Road Map for policy makers to tackle climate change by working on five different negotiating tracks: shared vision, mitigation, adaptation, technology and financing. Article (1.Ci) of the Bali calls for:

“...incentiviz[ing] the implementation of adaptation actions, and other ways to enable climate-resilient development and reduce vulnerability of all Parties, taking into account the urgent and immediate needs of developing countries that are particularly vulnerable to the adverse effects of climate change, especially the least developed countries and small island developing States, and further taking into account the needs of countries in Africa affected by drought, desertification and floods” (UNFCCC, 2007, Bali Action Plan. Decision 1/CP. 13).

This identification of specific vulnerable countries without a coherent definition and uniform way to measure vulnerability created internal conflict among members of the G77. Historically, from the inception of the UNFCCC, the debate around which countries would be considered the most vulnerable was restricted to SIDS, LDCs, and countries with fragile ecosystem. As a result, the Bali Action Plan omitted all middle-income developing countries in Latin America from these discussions, which prompted some countries to make a strong case for an expansion of the criteria for determining vulnerability.

As explained by Linda Siegele, negotiator for Cook Islands at COP 19, Columbia became the catalyst for internal strife within the G77 as it made the case for countries in Latin America to be considered among the most vulnerable. As a result, conflict ensued within the G77 among SIDS, LDCs and Latin American countries. Many negotiators from SIDS informed me at COP 19 that as a strategy to exert their influence, a bloc of countries in Latin America led by Colombia made it clear that the notion of “most vulnerable” should expand to include middle-income countries in the region. In order to attain such a goal, the terms “vulnerability” and “most vulnerable” were bracketed in negotiating texts, signifying that the countries could not agree on the definition of the terms. A negotiating text is essentially a draft of the outcome (e.g., decision and protocol) that is being negotiated with language not yet

agreed upon appearing within square brackets, or highlighted. The goal of such negotiations is to advance development of the outstanding language while at the same time finding ways to compromise in order to remove text from the brackets (Depledge, 2016). Finding “compromise language” regarding vulnerability within the G77 became challenging, as it was recognized that countries in Latin America had a legitimate argument to be included as “most vulnerable.” Colombia and the Latin American countries employed a legal argument to counter SIDS and LDCs notion of vulnerability, using language from the preamble of the UNFCCC, paragraph 19, to demonstrate their vulnerability:

“Recognizing further that low-lying and other small island countries, countries with low-lying coastal, arid and semi-arid areas or areas liable to floods, drought and desertification, and developing countries with fragile mountainous ecosystems are particularly vulnerable to the adverse effects of climate change,” (United Nations, 1992).

Many Latin American countries do fall into the above description because they are developing countries with fragile mountain ecosystems as well as low-lying coastal areas. As Linda Siegle further explained, in Cancun during COP 16, SIDS had to make a major compromise to appease the Latin American constituency, which included a promise from SIDS not pushing that they are only ones most vulnerable. The lack of clarity on vulnerability along with competition for limited financial and other resources have dampened SIDS’ claim on vulnerability. The issues of vulnerability continued beyond COP 16 and were prevalent during COP 21 in Paris.

Leading up to COP 21, during the climate change talks in Bonn in October 2015, many Central American countries continued to mobilize their resources to seek global “acknowledge[ment] that the region is especially vulnerable to climate change – a distinction currently given to small island developing states (SIDS) and least developed countries (LDCs)” (Ortiz, 2015). These countries included Belize, Costa Rica, Guatemala, Honduras, Nicaragua, and Panama. These countries are situated in a geographically vulnerable region because they are bordered by the Caribbean Sea within the Atlantic Hurricane path and the Pacific Ocean. The initiative by Central America to be identified as “most vulnerable” again created tensions within the G77 and even internally among Central American states, most notably as a result of strong opposition by Belize which is also a member of SIDS. In an interview with the Inter Press Agency, Tania Guillén, climate change officer at the Nicaragua Humboldt Center, explained that Belize did not support the proposal by the other Central American countries because it did not want to have “problems” with SIDS. This made it difficult for Central American countries to build consensus on a proposal that would essentially expand the list of countries that are considered most vulnerable within the negotiating text. Therefore, El Salvador on behalf of Costa Rica, Guatemala, Honduras, Nicaragua and Panamá proposed the following insertion at the end of paragraph 6 of the Preambular section of the draft text of the second session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP), the phrases: “and the Central American isthmus” (Calderon, 2015). Bhutan on behalf of Afghanistan, Bhutan, and Nepal also proposed language in the draft that would include small mountainous developing states as being among the most vulnerable. The Republic of Azerbaijan further expanded the notion of most vulnerable to also include “country Parties with fragile and vulnerable mountains, in particular small mountainous developing States”. By the end of the negotiations, paragraph 4 of the final draft text of the ADP read as follows (bracketed text under debate) :

“[Taking account of the [particular vulnerabilities and specific needs of][particularly vulnerable][urgent and immediate needs and special circumstances of] developing country Parties, especially [those that are particularly vulnerable, including] the least developed country (LDC) Parties [and other Parties identified in Article

4.8 of the Convention], small island developing states (SIDS) [, small mountainous developing states] and Africa, [and the central American isthmus]] [Taking full account of the specific needs and special situations of the least developed countries and small island developing states arising from the adverse impacts of climate change]” (UNFCCC, 2015).

The Political wrangling on vulnerability continued in COP 21 in Paris. Again, Latin American countries continued to argue for their vulnerability. As indicated by Mr. Dauvergne, Latin American countries, especially those in Central America, continued to cite the CAF (2014) report to argue for their vulnerability. The final text out of the Paris Agreement as it relates to defining “particularly vulnerable” states:

“Also recognizing the specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, as provided for in the Convention” (UNFCCC Secretariat, 2015)

Such a description of vulnerable/vulnerability does two things. First, it returns the vulnerability discourse to the murky and vague description of paragraph 19 from the preamble of the UNFCCC convention, which has created much debate among academics and conflict among policy makers. Second, Latin American countries and countries with vulnerable mountainous regions were not specifically identified as especially vulnerable, a recognition given to SIDS and LDCs. The term “especially” or “particularly” vulnerable as indicated by Mr. Dauvergne makes it possible for those countries to receive priority for climate change resources such adaptation financing, capacity building, and technological transfer. We argue that this was a missed opportunity by policy makers to strengthen and clarify the term vulnerability, which will likely lead to continued confusion and intra-bloc conflict in future negotiations within the UNFCCC.

In summary, our interviews revealed four major issues related to SIDS’ vulnerabilities as well as the challenges they create within the UNFCCC (Table 1). The fact that there is no coherent definition of vulnerability creates tension within the G77 as countries compete for financial and technical resources. As a result, countries use different metrics to demonstrate their vulnerabilities in order to position themselves to receive a greater share of assistance. An additional issue is the fact that addressing vulnerability assessment within the UNFCCC has typically occurred under the purview of adaptation, but historically the UNFCCC has prioritized mitigation policies over adaptation. Significant action to address vulnerability did not take place until COP 13 in Bali and an institutionalized framework to address vulnerability was not created until COP 17 in Cancun under the auspices of the Adaptation Committee. Thus, languid efforts to address adaptation resulted in fewer resources to address vulnerability.

### 3. Implications for SIDS

The literature on vulnerability and natural disasters as it relates to SIDS remains under-developed (Pelling, 2001; Mimura et al., 2007). This has great implications for SIDS both in academia and in policy. We present several major issues on that front. We begin by demonstrating how competing conceptual and methodological frameworks of vulnerability impact SIDS in two ways: (1) by evaluating the risk-hazard framework and its implications on adaptation and mitigation strategies for SIDS, and (2) by showing how the literature on SIDS fails to investigate the structural relationships between government decision-making and policy implementation for small islands (Pelling, and Uitto 2001), following a political economy or social constructivist framework. Finally, we examine how SIDS’ vulnerabilities have been exacerbated by the slow pace of addressing adaptation issues within the UNFCCC, as a result of historical prioritization of mitigation policies over adaptation.

**Table 1**

Key Findings from AOSIS Policymaker Interviews.

Key Questions	AOSIS Participants and COP Venue	Key Findings	Implications of Findings for SIDS Vulnerabilities
Is there a formal definition of vulnerability that parties follow at the negotiations?	Tuvalu (COP 19 <sup>b</sup> ), Saint Lucia (COP 19 <sup>a</sup> , COP 21 <sup>b</sup> ), Cook Islands (COP 19 <sup>a</sup> ), Marshall Islands (COP 19 <sup>a</sup> ), Samoa (COP 19 <sup>a</sup> )	<ul style="list-style-type: none"> <li>There is no clear definition of vulnerability within the UNFCCC.</li> </ul>	<ul style="list-style-type: none"> <li>Texts that acknowledge SIDS as being among the most vulnerable, such as the preamble of the convention and the Paris Agreement, do not always present a coherent picture of vulnerability for SIDS.</li> </ul>
Are there any conflicts by state parties regarding definitions or concepts of vulnerability?	Tuvalu (COP 19 <sup>b</sup> ), Saint Lucia (COP 19 <sup>a</sup> , COP 21 <sup>b</sup> ), Cook Islands (COP 19 <sup>a</sup> ), Marshall Islands (COP 19 <sup>a</sup> ), Samoa (COP 19 <sup>a</sup> )	<ul style="list-style-type: none"> <li>Many developing countries such as African and Latin American countries believe that their vulnerabilities are not prioritized with the UNFCCC.</li> <li>This creates fragmentation within the larger G77, leading to competition among developing countries about who is most vulnerable.</li> </ul>	<ul style="list-style-type: none"> <li>Forces SIDS to compete for limited financial and technical resources available to the most vulnerable.</li> <li>Different metrics and indices to measure vulnerability provide different accounts of countries' vulnerability.</li> </ul>
How has AOSIS addressed the issues of vulnerability at the negotiations?	Tuvalu (COP 19 <sup>b</sup> ), Saint Lucia (COP 19 <sup>a</sup> , COP 21 <sup>b</sup> ), Cook Islands (COP 19 <sup>a</sup> ), Marshall Islands (COP 19 <sup>a</sup> ), Samoa (COP 19 <sup>a</sup> )	<ul style="list-style-type: none"> <li>Continued effort by SIDS not only to remind states of their vulnerabilities but also to gain support of many ally constituencies within the G77 such as LDCs and Latin American countries.</li> <li>Vulnerability debates are tied to adaptation, which has historically been deprioritized in favor of mitigation.</li> <li>Discussions on vulnerability did not gain much traction until Bali at COP 13.</li> <li>Institutionalizing vulnerability did not take place until the forming of the Adaptation Committee in Cancun at COP 17.</li> </ul>	<ul style="list-style-type: none"> <li>SIDS continue to wield limited political and technical resources in demonstrating their vulnerability with the UNFCCC.</li> </ul>
Where have debates on vulnerability primarily taken place?	Tuvalu (COP 19 <sup>b</sup> ), Saint Lucia (COP 19 <sup>a</sup> , COP 21 <sup>b</sup> ), Cook Islands (COP 19 <sup>a</sup> ), Marshall Islands (COP 19 <sup>a</sup> ), Samoa (COP 19 <sup>a</sup> )		<ul style="list-style-type: none"> <li>Created tension among SIDS within the G77 because many countries felt their vulnerabilities were not accurately represented in Bali.</li> <li>The Bali Action Plan refer to particularly vulnerable countries as Small Island Developing States, Least Developed Countries and countries in Africa that suffer from droughts and floods.</li> <li>Slowness of dealing with adaptation resulted in less attention to SIDS vulnerabilities within the UNFCCC.</li> </ul>

<sup>a</sup> Interview conducted at the COP.<sup>b</sup> Interview conducted by Skype/email after the COP.

### 3.1. Competing vulnerability frameworks

Because vulnerability historically has been given more attention from a risk-hazard perspective, its deployment in the climate change research and policy discourse has primarily been with reference to mitigation rather than adaptation (Adger, 2001; Horstmann, 2008). However, given SIDS' vulnerabilities to natural disasters owing to their geographical location and marginalized economic, political, social, and environmental assets (Ashe et al., 1999; Pelling, 2001; Wisner and Gaillard, 2009; Kelman et al., 2009), SIDS will be forced to pursue adaptation as well as mitigation. Widespread adoption of a risk-hazard framework for vulnerability will provide policymakers with a better means of quantitatively monitoring and measuring greenhouse gases, but will do little to evaluate the effectiveness of adaptation policies over time. Furthermore, adaptation needs for SIDS are as diverse as the variety of islands in different regions or within the same nation states (Rasmussen et al., 2011), and require local perspectives to be effective (Betzold, 2015). For example, in the Caribbean, López-Marrero (2010) and López-Marrero and Yarnal (2010) found that in two flood-prone communities in Puerto Rico, flooding was perceived as only one of many hazards/risks of climate change, but not the most important. Instead, people were more concerned with "health conditions, family well-being, economic factors, and land tenure." A risk-hazard framework would have placed undue focus on the flooding event itself, which, while important, is primarily an aggravator of existing vulnerabilities stemming from weak adaptive capacity.

This emphasis on hazards and disasters, rather than adaptive capacity, often leads to underestimation of vulnerability among SIDS. In conceptualizing risk, Brooks et al. (2005) focus on disasters triggered by climatic or meteorological hazards. They argue that risk is a function of hazard and vulnerability, obtained through statistical measurement of a large number of potential proxies of vulnerability. Their analysis relies on a quantitative empirical assessment of vulnerability focused on mortality risk associated with climate-related disasters. A major limitation of their analysis is that it does not factor in many aspects of

social vulnerabilities. LDCs within SIDS such as Kiribati, Tuvalu, and the Maldives that face many environmental vulnerabilities are among the most vulnerable in the analysis of Brooks et al. (2005). However, SIDS vulnerabilities are not fully represented because the analysis does not take factors such as small size, isolation, elevation, and GDP into account. Further analysis of vulnerability within SIDS requires both quantitative assessments and qualitative assessments. This includes "both top-down assessments of biophysical climate changes and bottom-up assessments of what makes people and natural systems vulnerable to those changes" (Noble et al., 2014). Furthermore, the assertion that "countries that are exposed to frequent severe climate extremes are likely to be more prepared than those that are not, and are likely in many cases to have reduced their vulnerability through adaptation to recurrent climate hazards" (Brooks et al., 2005) is misleading because it does not include a qualitative analysis of the social context and perception of vulnerability on a local scale. In order to more accurately assess the vulnerability of SIDS, studies should complement a risk-hazard approach with frameworks that explicitly account for place-specific political and socioeconomic factors. We argue that a social constructivist approach rooted in the political economy of SIDS offers perspectives on vulnerability that a risk-hazard framework alone cannot. Such an approach emphasizes human agency and culture in explaining differential vulnerability. There is a substantial body of literature on how culture explains societal behavior regarding risk. For example, culture shapes the definition of exposure to risk and how people interpret or perceive their natural and physical environment (Roncoli et al., 2009; Crate, 2011). Foundational work on the cultural theory of risk suggests that risk perception is a social process because due to the theoretically infinite number of possible dangers to society, priority in risk mitigation and management must be given to those dangers that present the greatest threat (Douglas and Wildavsky, 1983). Structure of social organization reinforces certain perceptions of risk while minimizing perception of risk in other cases; for example, many U.S. Republicans disregard risks associated with climate change because they do not believe it to be real, therefore making it difficult to

pass climate change legislation (McCright and Dunlap, 2011). President Trump's decision to withdraw from the Paris Climate Agreement, which is supported by many evangelical Republicans, is a perfect example of this. Once a risk is perceived by society, through physiological, social, cultural, and institutional process it can either amplify or attenuate responses by the community or general public (Kasperson et al., 1988).

Furthermore, social categories such as gender, class, ethnicity, and race are important facets to a constructivist approach to vulnerability. Those who are exposed to a disaster are not only victims but also active agents, and the ways they internalize these experiences, mediated by their sociocultural identity, are instrumental in determining their level of vulnerability. As Füssel and Klein et al., 2006 assert, "constructivists have transformed our understanding of the role played by agency and culture in producing differential vulnerability among individuals and groups even when they confront seemingly identical risks."

In order to provide SIDS with greater agency, accessibility to information and resources is very important. Citing Lata and Nunn (2012); Betzold (2015) notes that many people in Vutia, a rural community on Viti Levu, Fiji's main island, are unfamiliar with climate change. Lack of familiarity and information leads to greater vulnerability because it can lead to making uninformed decisions relating to climate change. Climate change is seen by many islanders (including where climate change is familiar) a problem created by foreign developed countries, and should therefore be the responsibility of developed countries to solve it (Betzold, 2015). Such beliefs impair national and local efforts to pursue adaptation for local communities. In addition, language barriers often complicate the communication of climate risks in SIDS, hindering both decision- and policy-making on climate change. Much of the scholarship and information on climate change is in English, which impedes communication in non-English-speaking SIDS and further reinforces the perception of climate change as a foreign problem (Barnett and Campbell, 2010 and Betzold, 2015).

Coordination among researchers and local community can help solve these issues. For example, local communities can provide first hand experiences on how climate change impact them, providing social context that is essential to understanding locally-specific aspects of vulnerability. From a political economy standpoint, research on SIDS needs to focus on ways to strengthen individual and communities' capacity to deal with external stress by improving technological transfer, improving social and economic institutions.

The UNFCCC has historically favored mitigation policies and approaches to address climate change (Pielke, 1998; Wilbanks et al., 2003; Füssel and Klein et al., 2006; Schipper and Lisa, 2006). The original focus of the UNFCCC was "on reducing the source of climate change, rather than on adapting to the changes" (Schipper and Lisa, 2006). Mitigation aims to address the causes of climate change and developed countries have a historical responsibility to climate change because of their part in emitting GHGs in the atmosphere. The principle of common but differentiated responsibility plays a fundamental role in how countries have addressed climate change. So logically the expectations at COP 3 in Kyoto were that developed countries would reduce emissions and set targets, creating the basis for the Kyoto Protocol. Although some of the proceeds for the Clean Development Mechanisms (CDM) were used for adaptation, this was not the main goal of the Kyoto Protocol.

As indicated by Moser and Ekstrom (2010), "adaptation researchers have generally assumed lower vulnerability and greater adaptive capacity in developed countries than in developing countries and thus have focused more research in the latter." During the early stages of climate change negotiations, there were expectations that at the international level mitigation policy would be sufficient to address the harmful effects of climate change (Schipper 2006). Therefore, the need to adapt to the adverse effects of climate change was less important and countries such as SIDS became more vulnerable, since resources and political capital prioritized mitigation over adaptation.

Within the UNFCCC, there were several reasons for prioritizing

mitigation policies over adaptation. One reason is the expectation that mitigation would reduce impacts at a global scale vis-à-vis all climate-sensitive systems, whereas adaptation measures are typically limited to regional to local scales or a limited number of climate-sensitive systems. This disconnect between the perceived global-scale solutions to climate change and its concrete local-scale impacts has underpinned the political challenges faced by SIDS, which again heightened their vulnerability throughout the UNFCCC process. A second reason is that quantitatively monitoring and measuring GHG is much easier than evaluating the effectiveness of adaptation policies over time (Shipper 2006).

Mr. Dauvergne points out that the terms of mitigation negotiations are fairly straightforward compared to adaptation because mitigation is easier to measure and quantify, primarily through the setting and accounting of GHG targets and inventories. There are many Clean Development Mechanisms (CDM) to reduce emissions such as green renewable energy (solar, wind, hydro etc.), clean transport, carbon capture storage, and reforestation. These methods of mitigation are fairly easy to translate from policy to action, making it much easier to use market-based mechanisms to address mitigation. This in turn is much more favorable to developed countries because it is more politically and economically accepted from a policy perspective. The impacts of adaptation have historically been felt more in poor developing countries like SIDS. Therefore, developed countries naturally would rather focus their efforts within their own countries. Transitioning to a green economy provides incentives for developed countries to invest in their own industries. Again, these policy actions by developed countries ignore the need to strengthen SIDS adaptive capacities and intensify their vulnerability to deal with climate change.

Another reason why mitigation has been favored over adaptation is that developed countries can meet their targets and still carry out a business as usual approach. They do not have to entirely mitigate emissions internally, but have the option to carry out mitigation activities elsewhere through mechanisms such as carbon trading, enabling developed countries to continue polluting while meeting their GHG targets. In contrast, adaptation for the most part is very site specific. For example, land use, managing biodiversity, is highly location specific. For example, in 2005, one quarter of the existing shoreline in Papua New Guinea had already been inundated and about 50–80% of the land in the Maldives and Papua New Guinea are less than 1 m above mean sea level (Secretariat UNFCCC, 2005). Each island in SIDS experience different set of vulnerabilities that are magnified given their small size, geographic isolation, and undiversified economy. Unlike setting and measuring GHG emissions it is much more difficult to quantify and measure adaptation. Part of the reason goes back to what vulnerability assessment a country uses to help determine what adaptation strategies are needed. Because adaptation occurs at the local scale, stakeholders, experts, and policy makers have diverse views on how to define success. SIDS are a highly diverse group with a wide range of cultural and institutional resources; therefore, one island may deem certain adaptation strategies as being successful while another may not. Adaptation is highly dependent on the quality of the scientific modes of measuring vulnerability. For example, as indicated by Mr. Dauvergne, when SIDS were employing adaptation strategies in an effort to build resilience, a lot of the adaptation strategies were geared towards dealing with sea level rise. However, as the science improved issue of ocean acidification became ubiquitous affecting major coal and fisheries. This dilemma has major implications on fragile economies such as SIDS. For one it makes it much for difficult for SIDS to set adaptation targets and two more difficult to measure and define how sufficient these targets were met. Thus, there is clear evidence that SIDS' vulnerabilities were magnified because mitigating GHG emissions was given primacy over adapting to climate at the UNFCCC and within academia, particularly by developed parties.

#### 4. Conclusions

It is widely agreed that SIDS are among the most vulnerable countries on the planet. However, as we have argued, the academic literature on vulnerability lacks coherence in terms of its definition and measurement. Part of the problem is a lack of a comprehensive methodological framework in measuring vulnerability. UNFCCC proceedings have also failed to clearly define vulnerability and this lack of clarity has led to tensions among developing countries. We argue that the principal reason that member states of the G77 and China could not agree on who are the most vulnerable. Being label as most vulnerable presents opportunities for countries to get access to financial and technical resources by the developing parties, to these most vulnerable states. Therefore, many developing countries took advantage of loose definitions of vulnerability and “most vulnerable” in an effort to maximize their accessibility to limited resources.

In order to better understand SIDS’ vulnerabilities, more emphasis on social context and perception of vulnerability on a local scale is of critical importance. We see culture as an important aspect of understanding vulnerability both as a way to provide indigenous knowledge and as a tool for local communities to communicate their vulnerabilities. For this reason, it is important to develop both research and policy that reflects local realities. The ambiguity of the vulnerability discourse complicates a very difficult UNFCCC process. There are no clear guidelines for measuring and evaluating vulnerability within the UNFCCC. This leads to a slowdown of the negotiating process and much tension within negotiating blocs such as the G77.

There is strong evidence to show that developed parties have failed to meet their obligations (post-Kyoto to Paris) and major developing parties continue to repeat the high-carbon development path of developed countries. We argue that in many cases, especially for SIDS, mitigation and adaptation efforts are not enough. Mitigation policies have been historical favored over adaptation, which in many cases have had major impact on SIDS’ ability to cope with the negative effects of climate change. Many mitigation policies and action stem from a risk-hazard perspective, which is important, however it is usually an indicator of existing vulnerabilities and weak adaptive capacities. As a result, we conclude that SIDS’ vulnerabilities have been aggravated by prioritizing mitigation over adaptation within the UNFCCC.

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